

siamensis, and *Encephalartos Barteri*. He lays special stress on the strands of the foliar organs, his unit of primary importance in relation to phylogeny being what he calls the *meriphyte*, the vascular axis of the stem being of secondary importance. Among other conclusions in reference to the strands of the leaves, he states (1) that the course of the vascular strands sometimes presents great complexities, and (2) that the classic Ω of the foliar arc, although usual, is not general, referring particularly to *Bowenia*. A later paper¹⁸ deals with the structure of the meriphyte of *Bowenia spectabilis*, and attempts to prove that the complex arrangement of the foliar strands even in this form can be reduced to the typical Ω .—R. THIESSEN.

In an earlier paper MATTE¹⁹ noted in certain ovulate sporophylls of *Ceratozamia* the occurrence of three or more vascular strands near the abaxial surface of the sporophyll, in addition to the row of strands that usually appears in transverse section. These accessory strands showed reversed orientation, the xylem being on the abaxial side; and MATTE regards this as an evidence of the union of two sporophylls along their edges.—CHARLES J. CHAMBERLAIN.

Problems of nutrition.—ARTARI published in 1904 an account of the influence of the different concentrations of glucose and saccharose upon the development of *Stichococcus bacillaris* and certain lichen-algae. This he now supplements²⁰ by investigating the effect of different concentrations of each component of the nutritive solutions upon the amount and energy of multiplication in *Stichococcus Chlorella* (a new physiological species) and the algae from *Xanthoria parietina*.

The concentration of NH_4NO_3 , which was the source of N, has no effect on *Chlorella* below 0.5 per cent., and on *Stichococcus* below 1 per cent.; but higher concentrations retard development, and suggest that the salt acts also in another way than by its osmotic pressure. The nutritive value of various sources of N varies according as glucose is present or absent. Glucose itself exercises an observable effect even at 0.005 per cent., and acts best between 0.5 and 2 per cent. The limiting concentration of monosaccharides, varying more or less with different algae, seems to be related to molecular weight, since it is about equal in monosaccharides (glucose, galactose, and fructose), and approximately double this limit in disaccharides (saccharose and lactose), which also agree together. Many other details, not easily related, are also recorded. A few observations upon the effect of concentration upon the form and size of cells are given incidentally; the author seems not to know of LIVINGSTON'S papers on this subject.—C. R. B.

¹⁸ MATTE, H., Compléments à la structure mériphytaire du *Bowenia spectabilis*. Compt. Rend. Acad. Sci. Paris, 409-416. 1905.

¹⁹ MATTE, H., Une anomalie de structure dans l'écaïlle ovulifère de *Ceratozamia mexicana*. Bull. Soc. Linn. Normandie V. 7:52-54. 1903.

²⁰ ARTARI, A., Der Einfluss der Konzentrationen der Nährlösungen auf die Entwicklung einiger grüner Algen. II. Jahrb. Wiss. Bot. 43:177-214. 1906.